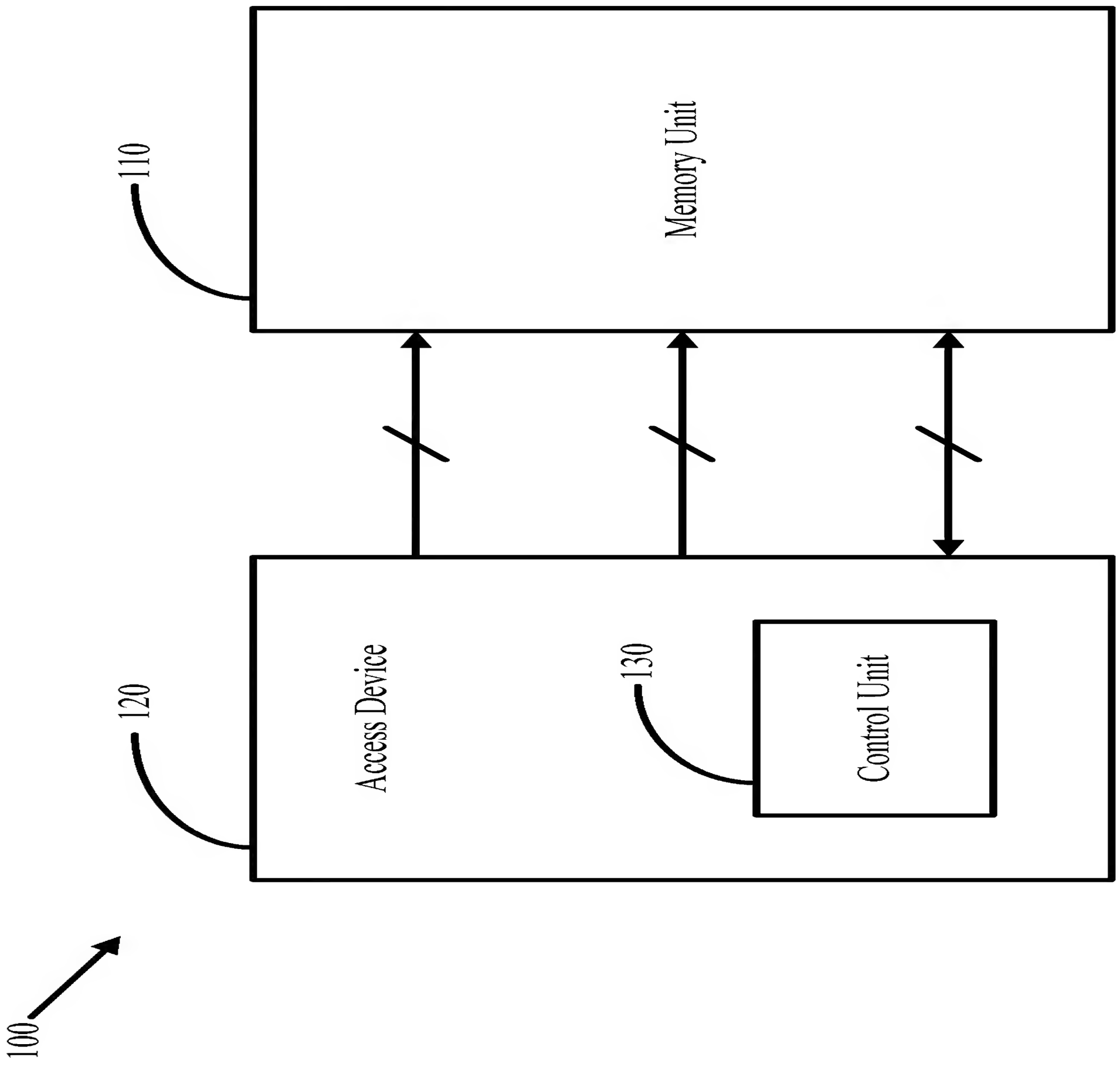

Figure 1

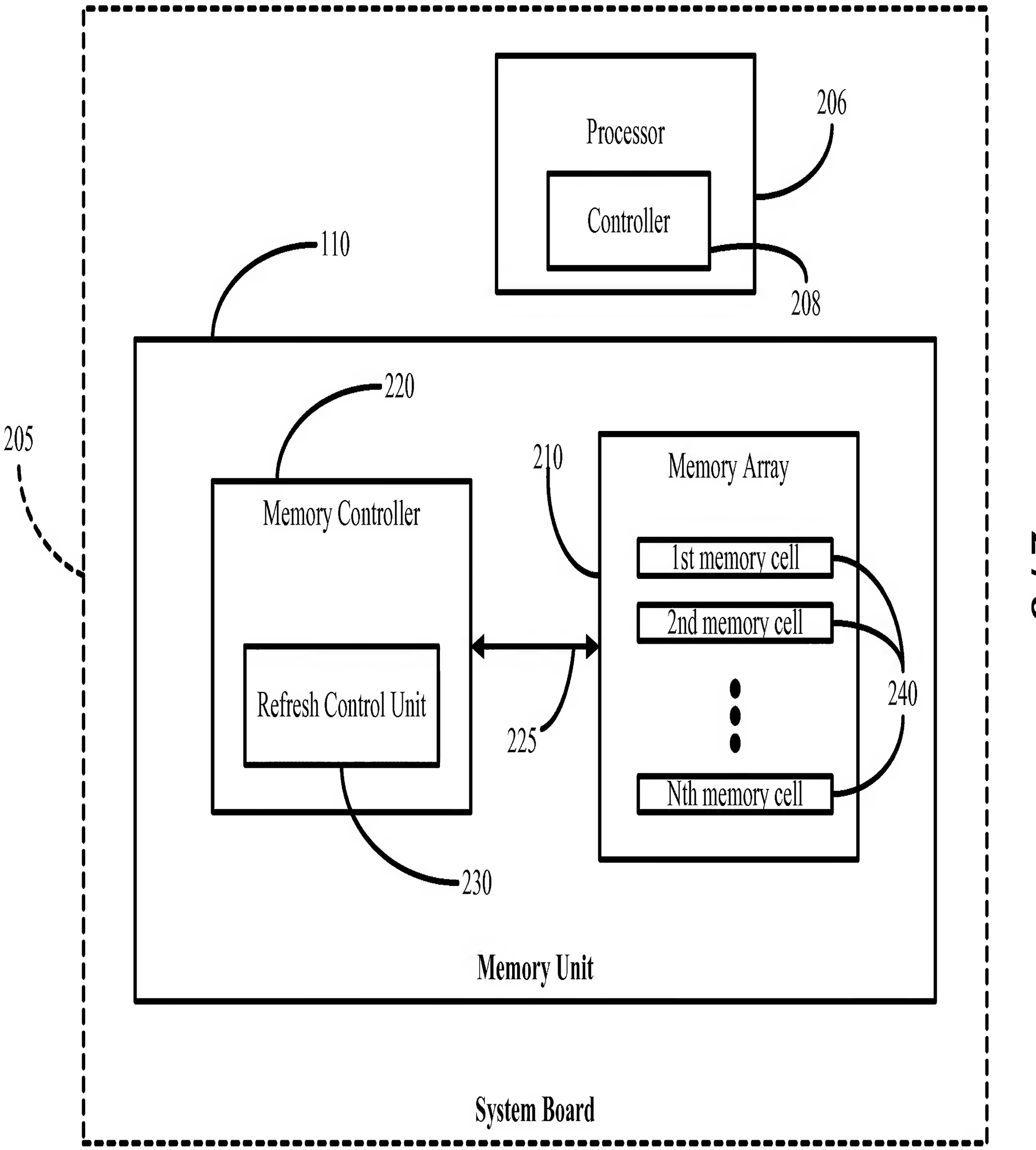
Processor
206
Controller
110
208
205
220
Memory Controller
210
Memory Array
1st memory cell
2nd memory cell
Refresh Control Unit
240
225
Nth memory cell
230
Memory Unit
System Board

Figure 2

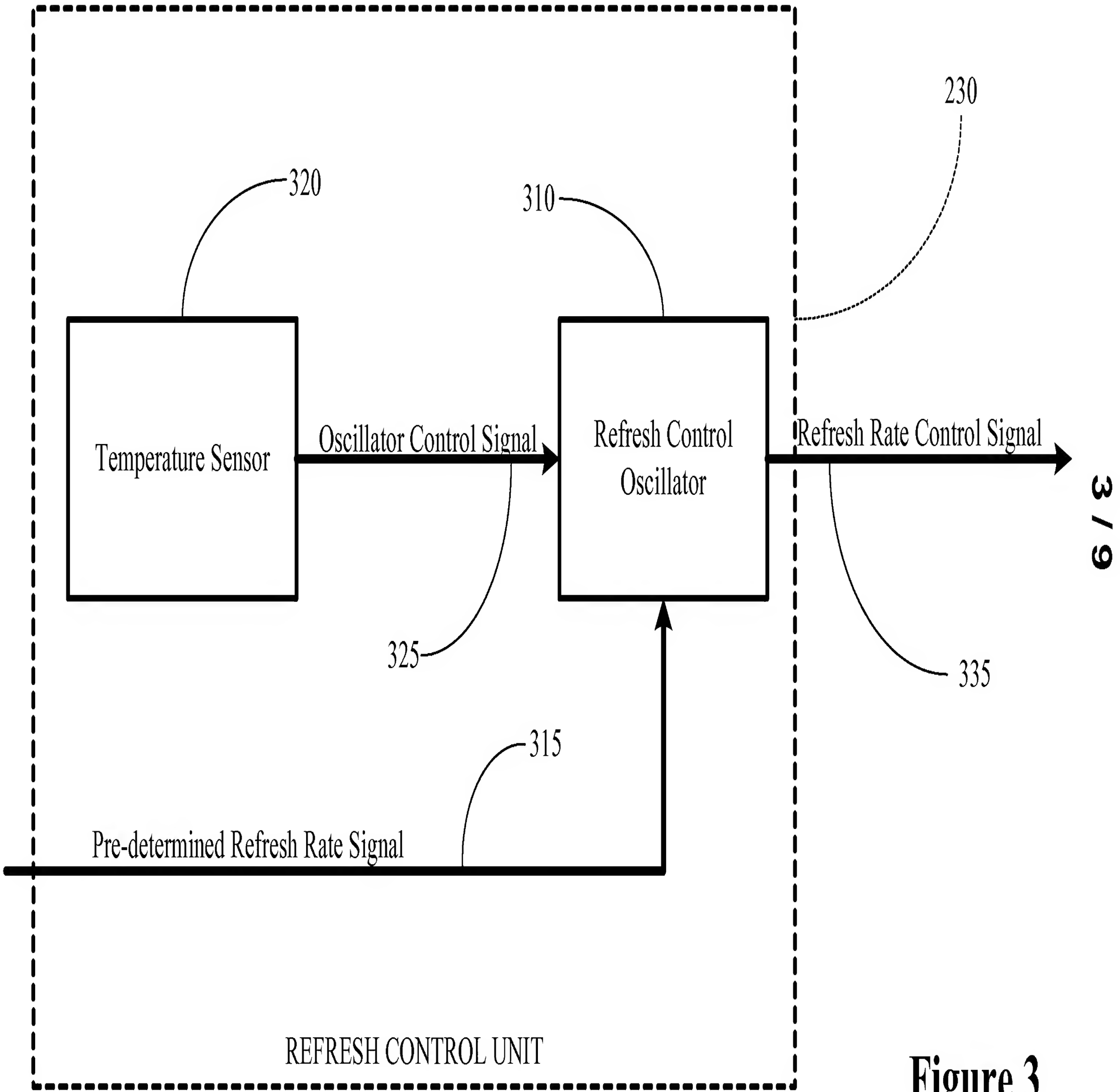
230
320
310
Temperature Sensor
Oscillator Control Signal
Refresh Control Oscillator
Refresh Rate Control Signal
325
335
315
Pre-determined Refresh Rate Signal
REFRESH CONTROL UNIT

Figure 3

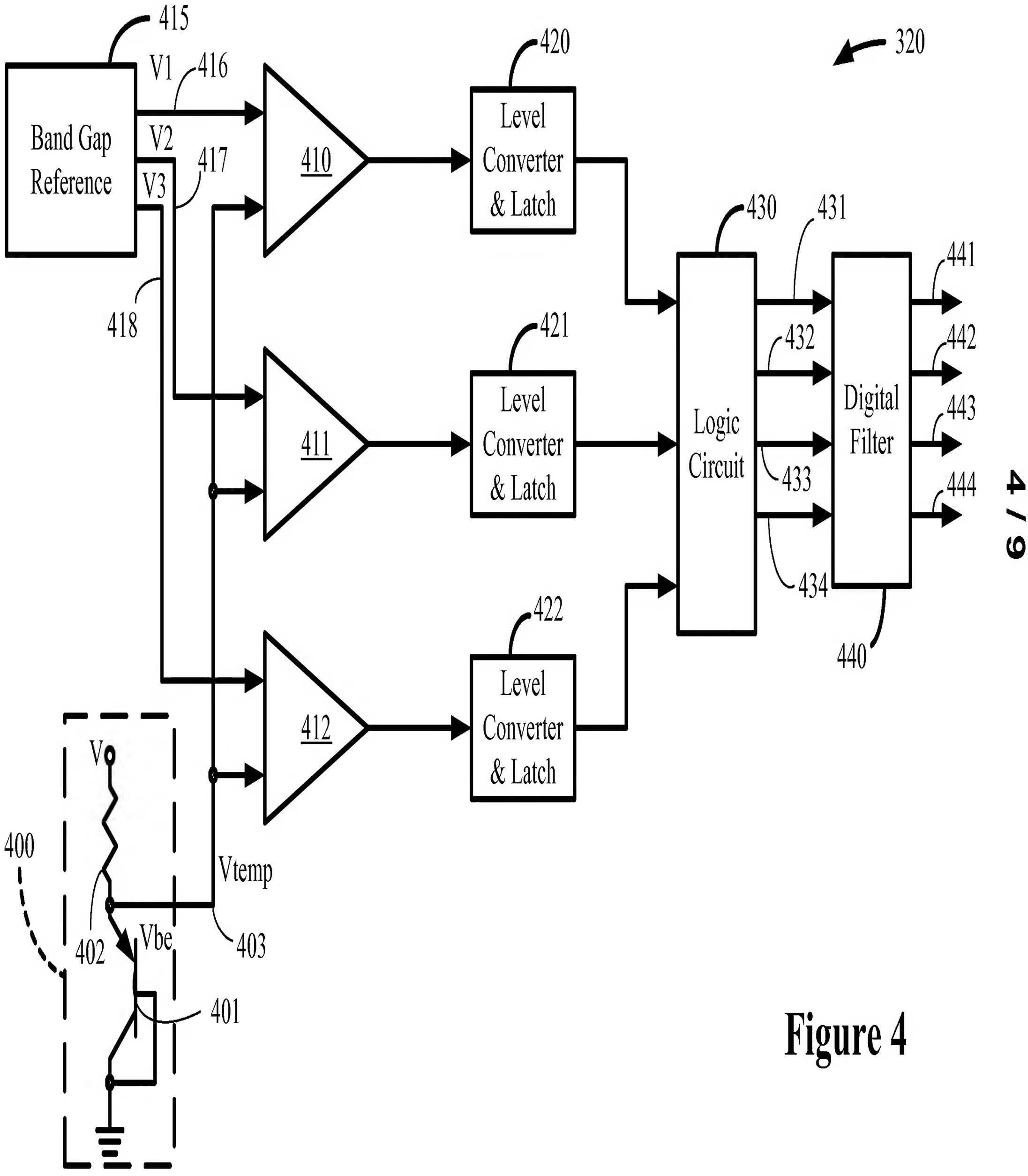
415
Band Gap Reference
V1
416
V2
417
V3
418
410
420
Level Converter & Latch
320
430
431
441
411
421
Level Converter & Latch
Logic Circuit
432
442
Digital Filter
433
443
434
444
440
412
422
Level Converter & Latch
V
400
Vtemp
402
Vbe
403
401

Figure 4

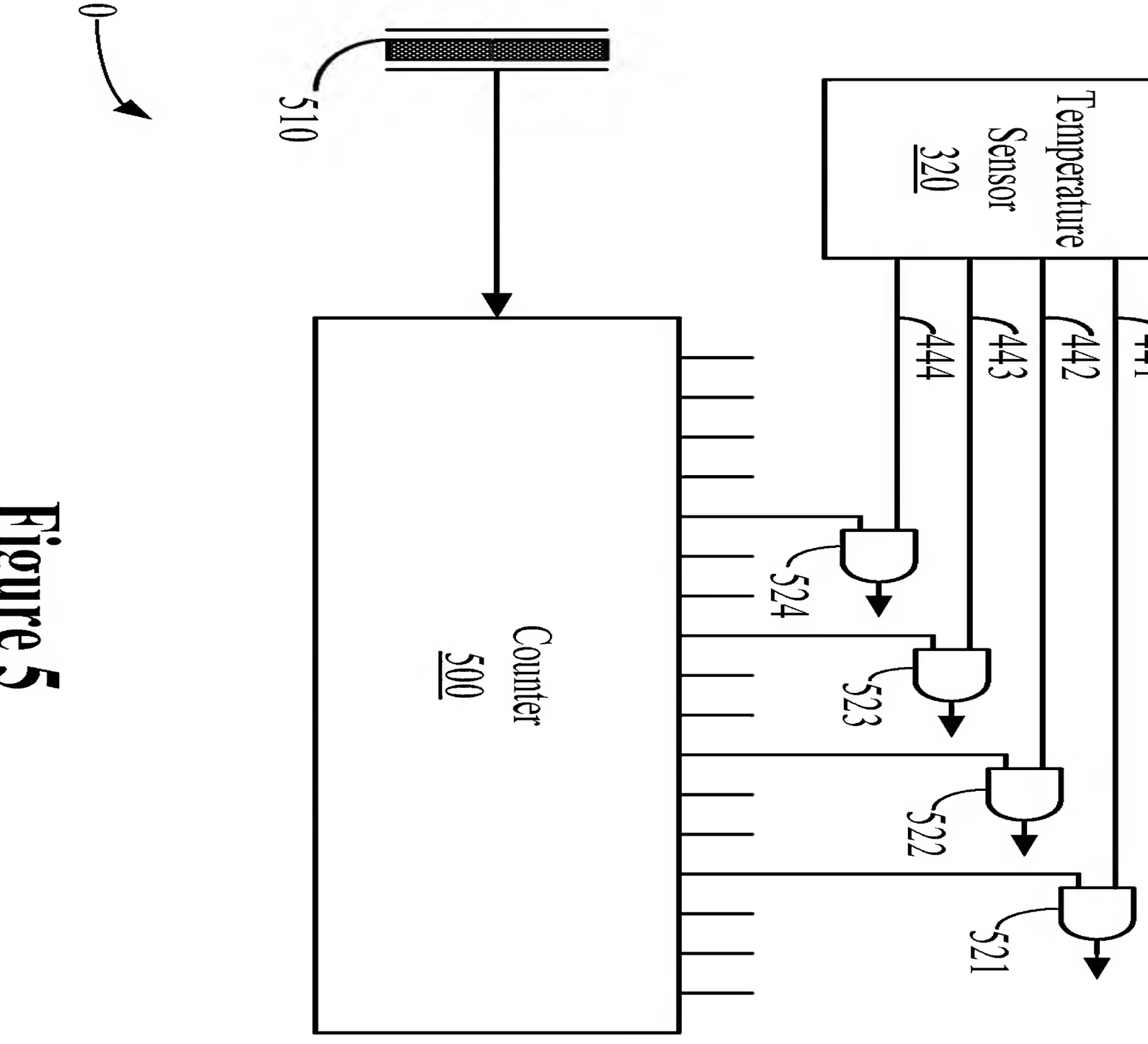
310
510
Temperature Sensor 320
441
442
443
444
524
523
522
521
Counter 500

Figure 5

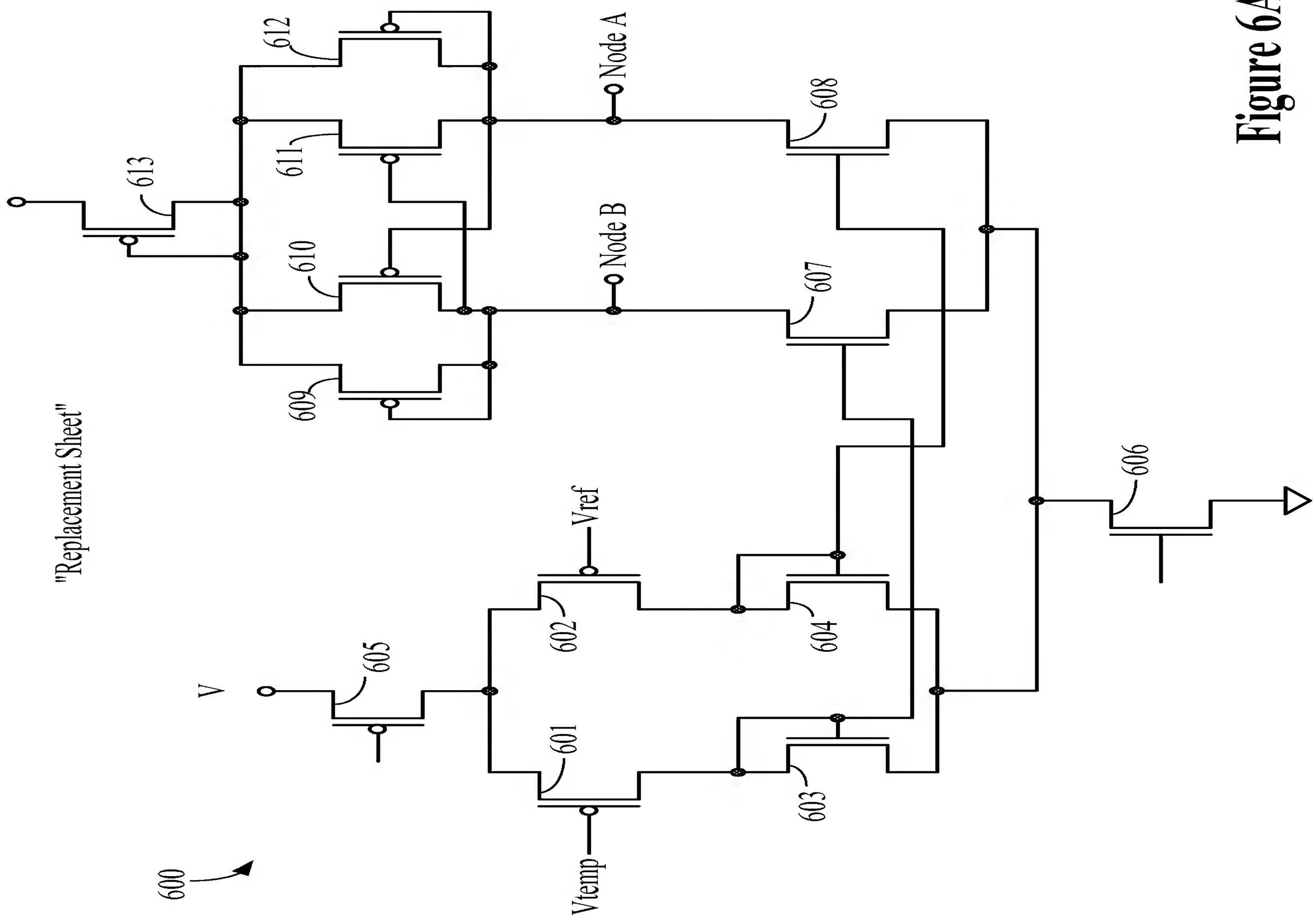
"Replacement Sheet"
600
V
Vtemp
Vref
Node A
Node B
601
602
603
604
605
606
607
608
609
610
611
612
613

Figure 6A

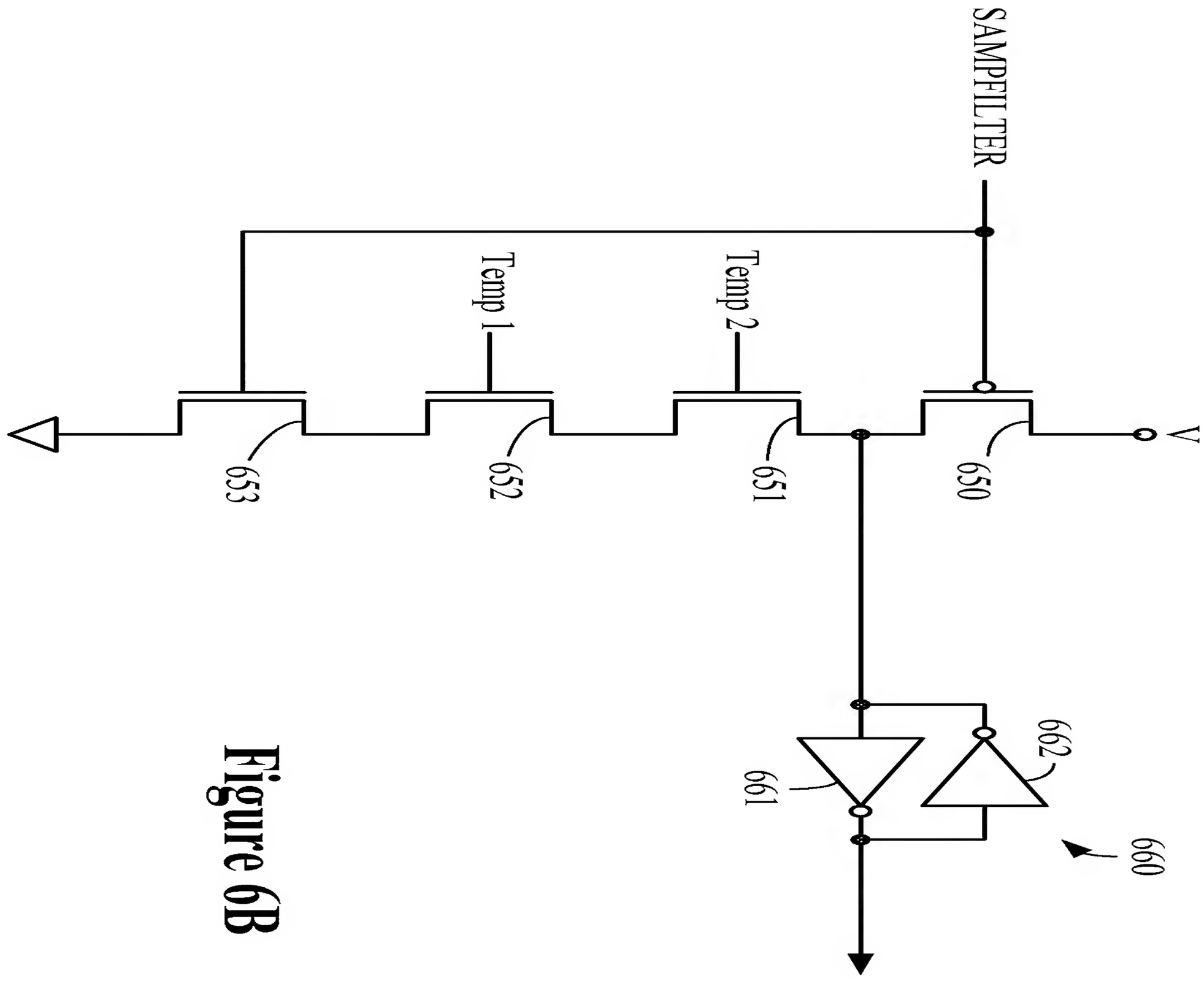

Figure 6B

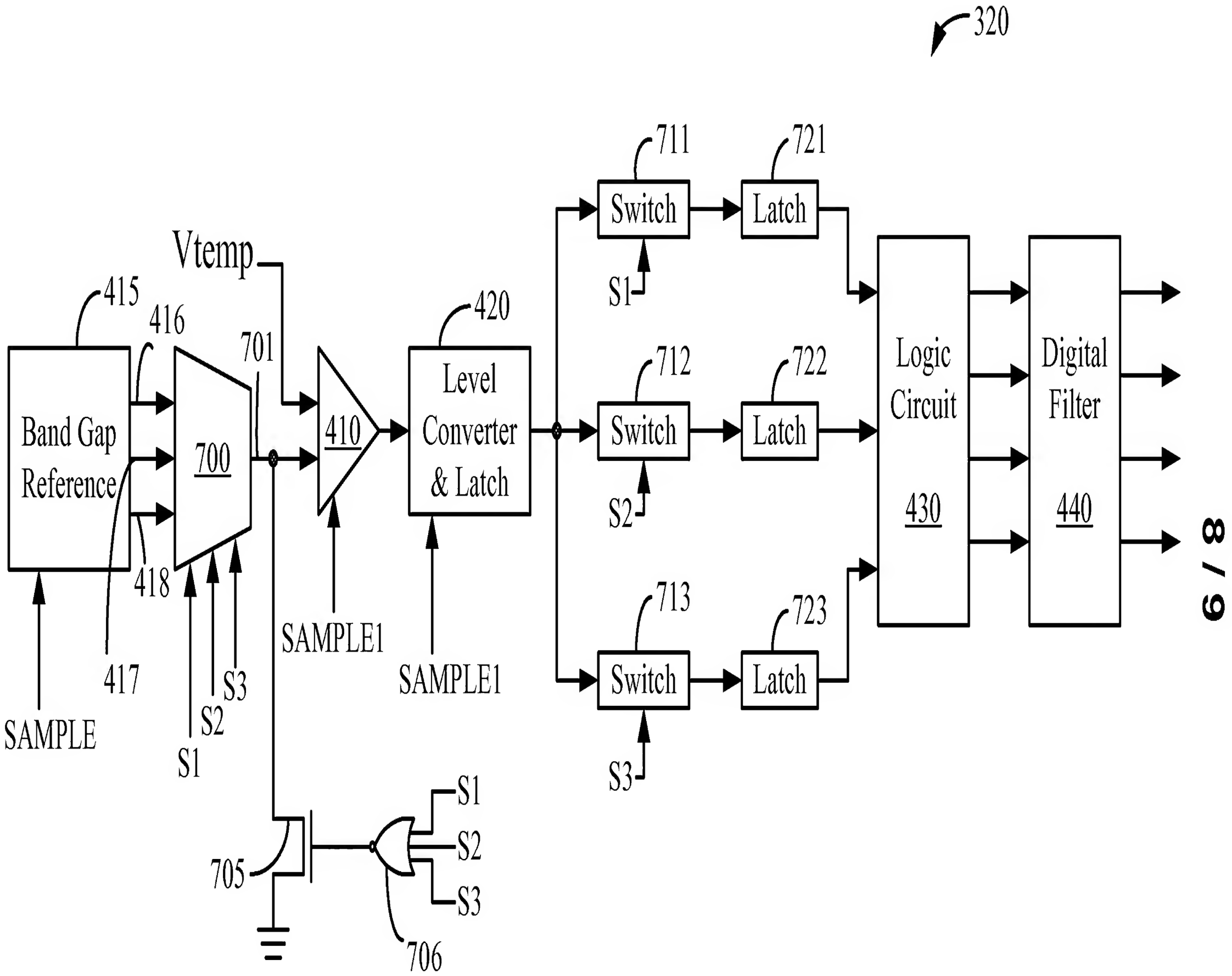
320
711
721
Switch
Latch
S1
Vtemp
415
416
701
420
712
722
Band Gap
Reference
700
410
Level
Converter
& Latch
Switch
Latch
Logic
Circuit
430
Digital
Filter
440
S2
418
713
723
417
S3
SAMPLE1
SAMPLE1
Switch
Latch
SAMPLE
S2
S1
S1
S2
705
S3
706

Figure 7
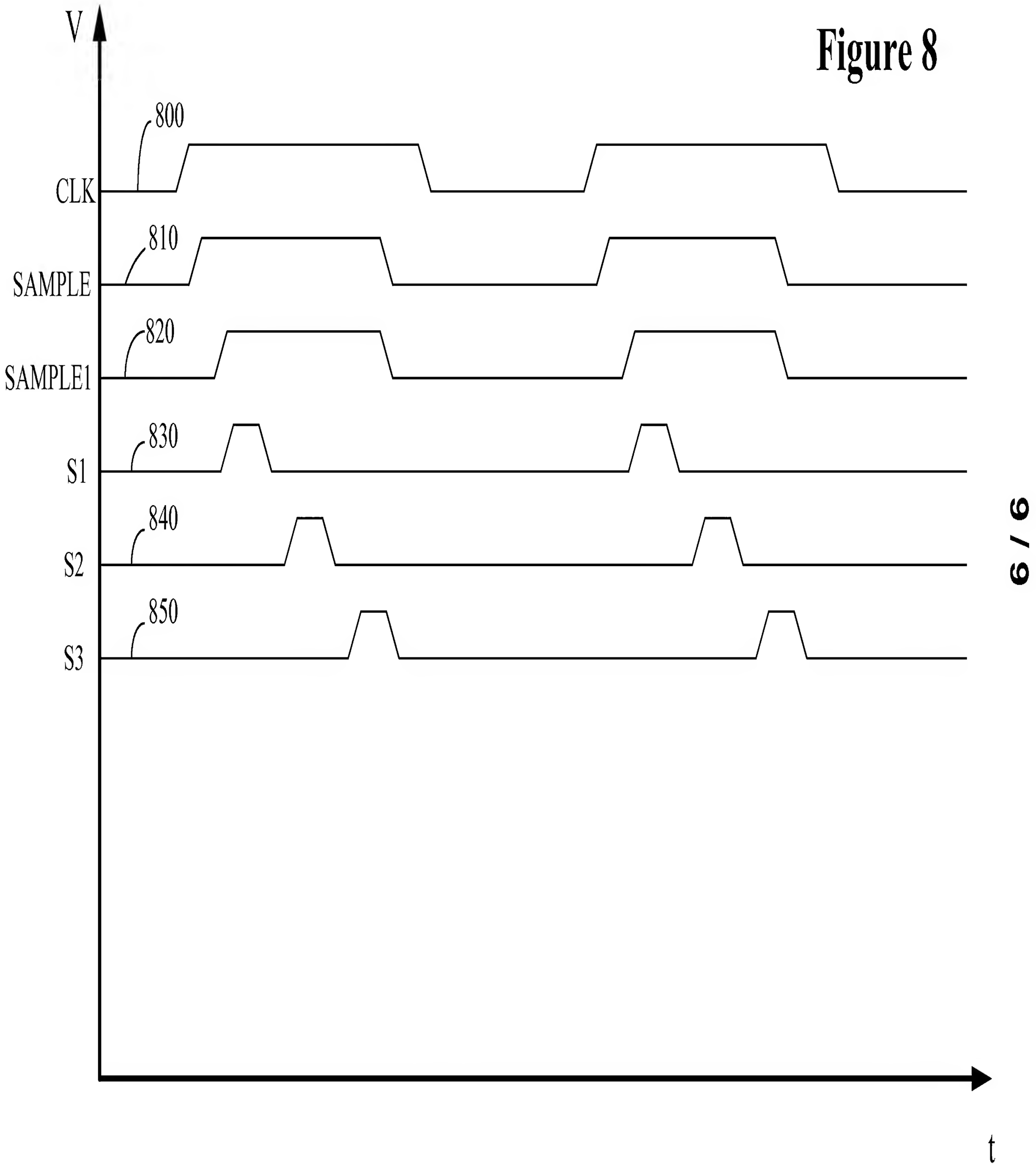
Figure 8